

MARATHON TECHNOLOGIES

Endurance FTvirtual Server Release Notes

Release 6.1.1

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SOFTWARE REVISION

The revision of the software that this document supports is Revision 6.1.1.

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Endurance FTvirtual Server Release Notes



About This Product

These *Release Notes* describe Endurance® FTvirtual Server Release 6.1.1 for Windows®.

For Technical Support

For technical support, contact your certified Endurance FTvirtual Server support provider. You can also consult the Endurance Support web site at <http://support.marathontechnologies.com> for additional documentation, the latest technical information such as supported platforms, and the Technical Information Knowledgebase. Login to the Support web site using your Endurance FTvirtual Server license key number.

Endurance Documentation

Endurance Release 6.1.1 documentation is available in the \Windows2000\Docs and the \Windows2003\Docs directories on the Endurance CD. Once Endurance software is installed, you can also launch the online manuals from the Windows Start menu by selecting from the **All Programs** (or **Programs**) menu, select **Marathon Endurance → Documentation**.

Use Adobe Acrobat Reader (Version 4 up to and including Version 7.0) to read and/or print the documentation. Acrobat Reader is included on the Endurance CD; you can install Acrobat Reader by launching the Endurance installation program and selecting Adobe® Acrobat® on the Installation Launcher screen.

The release documentation set consists of:

- *Endurance FTvirtual Server Administrator's Guide* (Admin.pdf), which describes how to manage and administer the Endurance FTvirtual Server and use its related Endurance tools and utilities.
- *Endurance FTvirtual Server Commands* (Commands.pdf), which lists and describes the Endurance FTvirtual Server commands used with the MTCCONS utility within scripts you write.
- *Endurance FTvirtual Server Configuration and Installation Guide* (Install.pdf), which explains how to install the software and configure the Endurance FTvirtual Server.
- *Endurance FTvirtual Server Messages* (Messages.pdf), which lists and describes the Endurance FTvirtual Server messages that may be displayed or are written to the Windows Event Logs.
- *Endurance Release Notes* (ReleaseNotes.pdf), this document, which describes Release 6.1.1 information, installation requirements, release considerations and limitations, and information that is not documented in the Endurance documentation set.
- *Getting Started with Endurance FTvirtual Server* (GettingStarted.pdf), which introduces the architecture and the general concepts of the Endurance FTvirtual Server.
- *Upgrading Endurance Software to Release 6.1.1* (Upgrade.pdf), which explains how to upgrade Endurance Release 5.0.1, 6.0, or 6.1 software to Endurance Release 6.1.1. This manual also describes how to upgrade an Endurance Configuration to Windows Server 2003 Service Pack 1.
- *Glossary* (Glossary.pdf), which lists and defines the Endurance terminology.

Release 6.1.1 System Requirements

A Endurance Configuration is comprised of two Intel-based servers (called CoServers), identically configured, and qualified by Marathon. Each server must contain the hardware described in [Table 1](#) and support the software described in [Table 2](#).

Table 1 Release 6.1.1 Hardware Requirements

Hardware Requirement	Notes
Either 2 Pentium 4 processors or 1 Pentium 4 processor with platform support for hyper-threading	<ul style="list-style-type: none">• All processors must be the same model and have compatible stepping.• A minimum processor speed of 1.5 GHz is recommended.
512 MB RAM	<ul style="list-style-type: none">• A maximum of 4 GB of memory is allowed in each CoServer.• A minimum of 768 MB of RAM is recommended
1 hard drive	<ul style="list-style-type: none">• Configurations consisting of a minimum of 1 or 2 hard drives per CoServer can be used. When using 1 hard drive per CoServer, you must use an Endurance Virtual Disk for the FTvirtual Server boot disk. When using two physical drives, one drive may be dedicated as the CoServer boot disk and the second as the FTvirtual Server boot disk.• NTFS partitions are required for all boot disks in the Endurance Configuration.
2 network ports	<ul style="list-style-type: none">• 2 1-Gb ports• 2 10/00 or 10/100/1000 ports
SCSI Host Bus Adapter, IDE Controller, Serial ATA, or RAID Controller	
1 CD-ROM	Can be either SCSI or IDE
2 crossover network cables	For non-SplitSite configurations, Category 6 copper or fiber compatible with your 1 gigabit network interface cards (CoServer Links)
2 network patch cables	Standard Ethernet connections to your production LAN
A remote server running Endurance Quorum Server	For SplitSite configurations only.

Table 2 Release 6.1.1 Software Requirements

Software Requirements	Notes
Microsoft Windows 2000	<ul style="list-style-type: none">• Server and Advanced Server versions are supported.• Service Pack 4 is the only supported Service Pack.• Before installing any Microsoft Security Updates, consult the Endurance Support web site at http://support.marathontechnologies.com to determine if the update is supported.
Microsoft Windows Server 2003	<ul style="list-style-type: none">• Standard Server• Standard Server with Windows Server 2003 Service Pack 1. Refer to <i>Upgrading Endurance Software to Release 6.1.1</i> for details on upgrading an Endurance configuration to Windows Server 2003 Service Pack 1.• Enterprise Server• Enterprise Server with Windows Server 2003 Service Pack 1. Refer to <i>Upgrading Endurance Software to Release 6.1.1</i> for details on upgrading an Endurance configuration to Windows Server 2003 Service Pack 1.
Endurance Manager clients and Endurance Device Redirector Utility	Remote installations of these Endurance applications are supported on Windows 2000 (all variants), Windows Server 2003 (all variants) and Windows XP.

What's New in Release 6.1.1

Windows Server 2003 Service Pack 1 Support

Release 6.1.1 provides support for Windows Server 2003 Service Pack 1. Before you can install Service Pack 1 on the FTvirtual Server or the CoServers, you must first update the Endurance software to Release 6.1.1. It is required that both CoServers and the FTvirtual Server be upgraded simultaneously. The CoServers will not join if the service pack levels do not match and the FTvirtual Server will not boot if its service pack level does not match the CoServer performing the boot.

Refer to *Upgrading Endurance Software to Release 6.1.1* for procedures to upgrade your system to Release 6.1.1 and to upgrade the FTvirtual Server and the CoServers to Windows Server 2003 Service Pack 1.

What's New in Release 6.1

SplitSite®

Endurance FTvirtual Server Version 6.1 provides SplitSite® capabilities to support disaster tolerant configurations. Splitsite allows the separation of CoServers into separate rooms, buildings, or geographies. If a disaster occurs at one facility, the CoServer in the surviving facility continues supporting application operations without interruption. To increase reliability and availability, the Endurance Quorum Service is provided. This service is installed separately and runs on one or more remote network clients placed in a third location apart from the CoServers. It negotiates CoServer communications and response to failure scenarios.

Splitsite is licensed as an option and is enabled when an Endurance Splitsite license key is entered during installation.

To manage the Quorum Server configuration, run the Endurance Manager and select **View→Properties...** from the menu. Then select **SplitSite** and the associated **Quorum Service Preferences** and **Quorum Service List** panes. Consult the *Endurance FTvirtual Server Administrator's Guide* and the Endurance Manager's online Help for more complete details on the parameters and settings that are shown.

See the *Endurance FTvirtual Server Configuration and Installation Guide* for details on the installation of the Endurance Quorum Service on a remote client.

CoServer Link Management

Endurance FTvirtual Server Version 6.1 provides enhanced CoServer Link management capabilities, including more detailed path information and path optimization features to help configure and tune your Endurance system.

To access these capabilities, run the Endurance Manager and select **View→Properties...** from the menu. Then select the **CoServer Link** or **Path Optimization** pane. Use the Endurance Manager's online Help for more complete details on the parameters and settings that are shown.

File Based Virtual Disks

Endurance FTvirtual Server Version 6.1 provides the capability to use file-based virtual disks to store FTvirtual Server data. A virtual disk can be created as an NTFS file initialized on any CoServer disk and mounted on the CoServer. The virtual disk appears to the CoServer operating system like any other physical drive unit.

The virtual disk is mounted like a physical disk and can be managed using the Windows Disk Management utility. Partitions can be created, formatted, and destroyed on the virtual disk as needed. Any number of virtual disks files can be created on a single physical CoServer disk. Each virtual disk is then available for redirection to the FTvirtual Server using the same Device Redirector functions you use to redirect a physical disk.

The CoServer installation procedure allows a virtual disk to be created during the Endurance software installation and used as the FTvirtual Server boot disk. A single physical boot drive can be used for both CoServer and FTvirtual Server boot disks when the FTvirtual Server boot disk is created from a file resident on the CoServer boot disk. See the *Endurance FTvirtual Server Configuration and Installation Guide* for details.

See *Managing Virtual Disks* in the *Endurance FTvirtual Server Administrator's Guide* for more details on creating and managing virtual disks. Also use the Device Redirector's online Help for information on the commands that are available.

SCSI Multi-path Support

Endurance FTvirtual Server Version 6.1 includes full compatibility with many available industry multipath drivers used for SAN storage devices. Multipath drivers, software packages that support enhanced access to SAN devices, are typically implemented as filter drivers in the Windows SCSI I/O driver stack and are loaded on the CoServer. Multipath drivers permit dual port Fibre Channel (FC) host bus adapters to be used to access SAN storage units and provide multiple pathways through FC switch fabrics. The primary use for multipath configurations is for additional reliability. However, many multipath drivers also include performance features that load-balance Fibre Channel I/O over both ports. The application of multipath I/O on CoServers is particularly effective in supporting increased redundancy if a switch or port fails.

The compatibility list of multipath drivers tested with Endurance FTvirtual Server Version 6.1 is available on the Marathon support web site at <http://support.marathontechologies.com>. For additional information regarding multipath configurations, see *Configuring the Endurance FTvirtual Server* in the *Endurance FTvirtual Server Configuration and Installation Guide*.

What You Need to Know About This Release

Boot Options

The Endurance software requires that certain switches be present on the command line in the CoServer's `boot.ini` file. The required switches differ depending upon the Windows service pack level.

- After the Endurance software has been installed on a CoServer that is running Windows Server 2003 with no service pack, or after all service packs have been removed from a CoServer, ensure that the CoServer `boot.ini` file contains the following options:
 - For a CoServer in *Online Endurance CoServer* mode:

```
/MAXMEM=256  
/ONECPU
```
 - For a CoServer in *Offline Endurance CoServer* mode:

```
/MAXMEM=256  
/ONECPU  
/NOMTC
```
- After the Endurance software has been installed on a CoServer running Windows Server 2003 Service Pack 1, or after a CoServer has been upgraded to Service Pack 1, ensure that the CoServer `boot.ini` file contains the following options:
 - For a CoServer in *Online Endurance CoServer* mode:

```
/MAXMEM=256  
/ONECPU  
/EXECUTE
```
 - For a CoServer in *Offline Endurance CoServer* mode:

```
/MAXMEM=256  
/ONECPU  
/EXECUTE  
/NOMTC
```

If the `boot.ini` file is modified to add or remove the `/EXECUTE` switch (or the related `/NOEXECUTE` switch) in a way that is inconsistent with the service pack level, the Endurance software will detect the change and modify the `boot.ini` file to restore consistency. The CoServer or the FTvirtual Server may not boot properly if these switches are not correct.

Data Execution Protection

The Endurance software precludes the use of hardware-based Data Execution Protection (DEP) in both the CoServer and FTvirtual Server environments. Software DEP is not affected.

HP BladeSystem EMS Console Must Be Disabled in BIOS

Endurance® FTvirtual Server Release 6.1.1 is not compatible with the EMS console on the HP BladeSystem. Symptoms include hangs during FTv install, or prompts during FTv install for Administrator passwords. EMS console is enabled by default in the BladeSystem BIOS, and must be disabled.

In the BIOS setup screen, select **BIOS Serial Console & EMS**, then select **EMS Console**, and set it to 'Disabled'.

Redirected Disk Size Limitations

Windows Server 2003 Service Pack 1 allows for disks larger in size than 2 terabytes. The Endurance software restricts redirection to disks 2 terabytes in size or less.

Network Connections Taskbar Icon

When Windows Server 2003 Service Pack 1 is installed on the CoServers and a redirected network cable is unplugged, a Network Connections icon will appear on the CoServer desktop taskbar indicating that the device is disconnected. However, due to an issue with the service pack, the icon will continue to indicate a disconnected state even after the connection is restored. This problem does not impact the operation of the Endurance Configuration. You can examine the state of the redirected network adapter in the Endurance Manager to verify that it is operational despite the erroneous taskbar icon.

To refresh the network connection states so that the icon is removed, click on the taskbar icon and the **Network Connections** utility will appear. Select **View → Refresh** from the menu bar and the taskbar icon will be removed or will no longer reflect the disconnected state.

Redirected SCSI Devices

If a SCSI CD-ROM, tape drive, or non-mirrored redirected disk drive is not available when the FTvirtualServer is booted, the device will not be seen by the FTvirtual Server, even if it subsequently becomes available (for example, the FTvirtual Server boots when CoServer 1 is unavailable, and CoServer 1 has a redirected CD-ROM device). To make such devices available to the FTvirtual Server when they become available on a configured CoServer, do the following:

- Using the Endurance Desktop application, log in to Windows on the FTvirtual Server using an account that has Administrator privileges.
- Right click on **My Computer** and select **Manage** to launch the Windows Computer Management utility. Click on **Device Manager** in the left hand pane, and then click on

SCSI and RAID controllers in the right hand pane.

- From the menu bar, select **Actions → Scan for hardware changes**. Any newly available redirected devices will become available to the FTvirtual Server.

Endurance Manager

- The Endurance Manager 5.0 or 5.0.1 is not compatible with Endurance FTvirtual Server Version 6.0, or greater, and will not connect to a Endurance FTvirtual Server Version 6.0, or greater, configuration.
- Only the local Endurance Configuration may be managed when running the Endurance Manager on a CoServer or an FTvirtual Server environment. It is not possible to connect to and manage a remote Endurance Configuration when running the Endurance Manager on a CoServer or an FTvirtual Server environment. You must install the Endurance Manager on a remote client in order to manage remote Endurance Configurations.
- If you change the IP address on the FTvirtual Server or a CoServer, it is necessary to stop and restart the Endurance Management Service. Failure to do so results in the inability to connect from a remote Endurance Manager.
- A user who is logged in to an account with a temporary user profile, such as the Guest account, will not be allowed to execute privileged functions from Endurance Manager. These accounts have "read-only" access to Endurance Manager functions.

SAN Configuration Limitations

If both CoServers have LUN's on the same SAN storage subsystem, and access to that subsystem fails completely, both CoServers may reboot causing the FTvirtual Server to be rebooted.

LUN's used by CoServer1 should be on different SAN subsystems from LUN's used by CoServer2.

Dynamic Disks

Endurance supports the use of dynamic disks. To use dynamic disks with the Endurance software, the following guidelines apply:

- Use a basic disk for the FTvirtual Server boot disk. Some Windows resource kit items may not support dynamic disks.
- Initialize all disks as basic disks on the CoServers.
- Use the Windows Disk Manager in the FTvirtual Server to create or update dynamic disks and to write the disk signature for disks other than the FTvirtual Server boot disk.

Managing volume creation or extension from any environment other than the FTvirtual Server will produce unpredictable results and is not supported.

- You can perform the following disk management activities from the FTvirtual Server:
 - Convert the FTvirtual Server data disks from Basic to Dynamic.
 - Configure FTvirtual Server data disks for simple volumes, spanned volumes, mirrored volumes, striped volumes, or RAID volumes.
 - Create or extend volumes that span multiple redirected FTvirtual Server data disks.

Redirected Device Behavior Under Windows Server 2003

Under Windows 2000, drives redirected to the FTvirtual Server can neither be accessed nor displayed from the CoServer. Under Windows Server 2003, drives redirected to the FTvirtual Server are inaccessible to the CoServer but they are displayed in the **Windows Disk Manager** and labelled *unreadable* or *unknown* on the CoServer.

FTvirtual Server Driver Signing Policy

The FTvirtual Server installation sets the Driver Signing Policy for the FTvirtual Server to Ignore in the Registry, and gives the user no warning notification about this change.

When you log in to the FTvirtual Server for the first time and set up an Administrator password, you can change file signature verification so that you are warned before unsigned drivers are installed. To do so, follow these steps:

1. From the **Control Panel**, select **System → Hardware**.
2. In the **Device Manager** section, select **Driver Signing**.
3. For Windows 2003, in the **What action do you want Windows to take?** section, click **Warn**, check **Make this action the system default**, and then **OK**.

For Windows 2000, in the **File signature verification** section, click **Warn**, check **Apply setting as system default**, and then **OK**.

Resetting this parameter to **Warn** causes a message to be displayed before any unsigned drivers are installed.

Installation

- In some configurations multiple drive letters appear in the **Windows Installation** window when you are installing Windows on the FTvirtual Server. You should choose the drive that you partitioned and formatted for the FTvirtual Server software and named as the

FTvirtual Server boot drive.

- After running the Endurance FTvirtual Server Windows installation on a CoServer, any attempt to run it again fails with the message, **Another version is already installed**. To recreate the Endurance FTvirtual Server on the CoServer, uninstall the Endurance FTvirtual Server and then re-install it.

FTvirtual Server Desktop

- Under Windows Server 2003, the screen resolution of the FTvirtual Server desktop cannot be changed by moving the slider in the Screen area on the **Settings** page of the **Display Properties** window. To change the resolution:
 1. Right-click on the desktop, and select **Properties→Settings→Advanced**.
 2. Click the **Adapter** tab, and then **List All Modes**.
 3. Select a resolution no greater than 1024x768.
- Windows Server 2003 sets the CoServer display settings to 32-bit color which can significantly consume system resources when the FTvirtual Server Desktop application is running. When the CoServer display setting is greater than 16-bit, this message is displayed. **Your CoServer's video color quality is set to a very high level. This consumes extra system resources and can have an adverse effect on performance. Do you want the Endurance FTvirtual Server Desktop application to adjust your color setting?** Selecting **Yes** reduces the color to 16 or 24 bit, depending on what is supported.
- The FTvirtual Server Desktop will not be adequate for applications that have the following display characteristics:
 - Color requirements other than 256 colors
 - Resolutions greater than 1024x768
 - Video BIOS (INT 10) calls
 - Color mouse pointers and animated mouse pointers are not recommended.
 - Full screen DOS mode
 - Direct Draw interfaces

If you have applications with these display characteristics, it is highly recommended that you run them using a Windows Remote Desktop Connection.

- The FTvirtual Server desktop now requires administrator privileges. When users without administrator privileges try to run the FTvirtual Server desktop application, the message **Administrator privilege is required in order to run the Endurance FTvirtual Server Desktop application** is displayed. If you are upgrading from a prior release, you must ensure that accounts using the FTvirtual Server desktop have administrator privilege. If administrative privilege cannot be granted, it is highly recommended that Windows

Remote Desktop Connection or Terminal Services be used in place of the FTvirtual Server desktop.

Accessing the Flex Boot Options During FTvirtual Server Boot

When booting the Endurance FTvirtual Server, the desktop should display a black screen window where you can press the F8 key to access the flex boot options such as safe mode, last known good, etc. On some systems there may not be sufficient time to press the <ctrl><shift>F12 key sequence (to change the focus to the Endurance FTvirtual Server) and then the F8 key. If you set the **Input Device Automatic Switchover** setting to enabled, and press the F8 key as soon as the boot screen appears, you will see the flex boot mode menu. To set the **Input Device Automatic Switchover** setting to enabled access the Endurance Manager. Then select **View → Properties → Input Devices**, and click **enabled**.

Using Remote Control Applications from the FTvirtual Server

Terminal Services or the Remote Desktop Connection is the recommended remote control application to run on the FTvirtual Server. Remote control applications that replace the Endurance video drivers with their own drivers are not supported on the FTvirtual Server.

Supported Redirected Device Types

The following types of devices can be made available for use on (i.e. redirected to) the FTvirtual Server:

- Ethernet network adapters
- SCSI devices: disk drives, CD-ROMs, tape drives, and medium changers
- IDE CD-ROMs
- Keyboards and mice
- Video

Network Configuration Requirements When SplitSite is not Enabled

For non-SplitSite configurations, the FTvirtual Server fault handler makes use of all available network paths connecting CoServers. Network paths include CoServer Links, CoServer Management Links, and Redirected Networks. At least one functional network path must be operating between the CoServers at all times. Therefore, CoServer Links must be directly connected with no intervening active components such as switches or routers. In addition, CoServers must be physically located adjacent to one another and network cables must be

routed in a manner that makes it impossible to sever all physical pathways between the CoServers simultaneously. Failure to follow these guidelines may result in loss of data in some failure scenarios.

Memory Synchronization Time and TCP/IP Time-out

Endurance software is designed to maintain client connections during resynchronization of the Virtual Servers. Memory synchronization requires a blackout period when all transactions are halted while the memory state is copied to the synchronizing Virtual Server. Typically, the blackout period is shorter than the TCP/IP time-out and consequently, client connections are maintained during resynchronization. When running Windows Server 2003 Enterprise Edition on the FTvirtual Server, the default setting uses a two-phase background synchronization technique. The first phase permits most of memory to be copied in the background with system operations continuing. The second phase typically requires an extremely short blackout time to complete memory synchronization.

Under Windows 2000 or when the foreground memory copy option is enabled, system operations are halted while all of memory is copied. In some large memory configurations, the blackout period may exceed the TCP/IP timeout value and connections may be lost temporarily. If this is a concern, you can use the Endurance Manager or the MTCCONS utility to disable automatic synchronization, and then use a script to schedule the resynchronization for a specific time period. See the Endurance Manager's online help and the *Endurance FTvirtual Server Commands* manual for information on how to do this.

Virtual Disks

- When creating a Virtual Disk the Device Redirector will allow you to specify a currently mounted Virtual Disk as the location for the new Virtual Disk file. This is not supported and will not work.
- When attempting to dismount a Virtual Disk, you may see the error **The device "Marathon Virtual Disk n" cannot be stopped right now. Try stopping the device again later.** Make sure there are no open files on the Virtual Disk, including viewing it in Windows Explorer, and retry the operation.
- When creating a Virtual Disk for use as the FTvirtual Server boot disk, Windows requires that you use a boot partition that is at least 1536 MB in size.

IBM FASTT Storage using the RDAC driver

All drives allocated to a single Endurance Configuration must be assigned to the same controller on a FASTT storage sub-system. IBM FASTT storage sub-systems have two controllers, and allow logical drives to be split between the two. A problem exists where if drives allocated to an Endurance system are split between the two, a failure of one of the controllers in the FASTT sub-system may cause a disk failure in the Endurance configuration.

Supported configurations:

- The two CoServers in the Endurance Configuration are connected to different FASTT sub-systems. All the drives allocated to CoServer 1 must be on the same controller (either A or B) on the FASTT sub-system serving its drives. The drives allocated to CoServer 2, on a separate FASTT sub-system, must also all be on the same controller on that sub-system. There is no interaction between the sub-systems, so if all of CoServer 1's drives are on controller A in FASTT sub-system 1, CoServer 2's drives can be on controller B in sub-system 2.
- The two CoServers both use drives from the same FASTT sub-system. All the drives for both CoServers must be on the same controller. All of CoServer 1's drives of FASTT sub-system 1 must be on one controller. If they are on controller A, then all of CoServer 2's drives on that same FASTT sub-system 1 must also be on controller A.

Third-Party Vendor and Application Limitations

- Applications with the following characteristics cause loss of Virtual Server synchronization:
 - Applications or drivers that use Pentium hardware performance counters.
 - Applications that install device drivers which may attempt to locate a product-key device, such as a dongle or specialized data acquisition hardware.
- Debug tools are not supported on the Endurance Configuration.

Open Source Components

Endurance management facilities utilize CORBA to establish and manage communications between the client software and server kernel components. This capability is implemented using open source software supplied through the omniORB and JacORB libraries. Sources for the omniORB library can be obtained from <http://omniORB.sourceforge.net>. Sources for the JacORB library can be obtained from <http://www.jacorb.com>.

General

- The Endurance Configuration must have completed the boot process, and all system services must have started before you shut down the FTvirtual Server.
- A Endurance Configuration cannot be put into hibernation, be suspended, or be powered down automatically.
- For systems running Windows Server 2003 without Service Pack 1, if you select **Start→All Programs→Accessories→System Tools→System Information**, on the FTvirtual Server or either of the CoServers, it will display the total physical memory installed in the CoServer for **Total Physical Memory**, as opposed to the memory allocated to the FTvirtual Server.

Slipstreaming the Windows Distribution Media

A

This appendix includes information on how to slipstream Service Pack 4 with your Windows 2000 distribution media.

To prepare the installation media to meet the Windows Service Pack 4 pre-requisite:

1. Locate an unpartitioned area, and create a partition of 400MB or larger, and format it NTFS.

Note: Often, there is an unpartitioned area resident on the local CoServer boot disk that has been reserved for contingencies such as this. Otherwise, you may meet this disk requirement using a resource on a network that can be mapped to from this CoServer. In extreme cases, skip the format and prepare the kit at the root of an existing partition with ample free space.

2. Insert your Windows 2000 installation CD into the local CD-ROM drive.
3. In a cmd window, copy the files from the Windows distribution CD.

For example:

- **mkdir Drive:\W2K\i386**
- **xcopy D:\CDROM_* Drive:\W2K**
- **xcopy /E D:\i386 Drive:\W2K\i386**

Apply the Service Pack update W2ksp4.exe (or higher) to the area you created . You may have to replace the CD or browse to where the Service Pack is stored on the network.

For example, **W2ksp4.exe /S:Drive:\W2K**

Note: In the above commands, for *Drive:* substitute the drive letter of the disk partition you are using to stage the installation kit. For *D:* substitute the driver letter of your installation source media.

